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# Macroeconomic Policy Making, Exchange Rate Adjustment and Current Account Imbalances in Emerging Markets

## Abstract

Since a series of crisis events after 2007, the discussion about the adjustment channels of current account imbalances has been revived. We discuss the effectiveness of exchange rates versus macroeconomic policies to rebalance current accounts for a set of 86 mainly emerging market economies. We find that nominal exchange rates are not a sufficient adjustment channel for (unsustainable) current account positions. Instead, depending on the region, monetary and/or fiscal policies are the main determinants of current accounts. For East Asia and the oil exporting countries sterilization policies, i.e. relatively tight monetary policies, are the main determinants. In contrast the main driving forces for emerging and southern Europe are fiscal policy stances. Only for the Latin American countries the exchange rate seems to play a significant role.

JEL-Code: F430, E420, F310.

Keywords: global imbalances, intra-european imbalances, exchange rate adjustment, monetary policy, fiscal policy.

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## 1. Introduction

Despite a major contraction in the wake of the US subprime crisis and the European debt crisis global current account imbalances, in particular outside of Europe, persist. They contribute to a further widening of the stock of global imbalances in form of diverging net foreign asset positions (Lane and Milesi-Ferretti 2014). Whereas dire adjustment programs within the European (Monetary) Union have mainly eliminated crisis-prone current account deficits within Europe, in most other emerging market economies the current account positions have remained an economic policy concern. This has been in particular the case for a set of emerging market economies such as Brazil, Turkey or India, because their current accounts constitute the breeding ground for classical balance of payments and foreign debt crisis due to risky foreign exchange exposure. But also the current account surpluses in East Asia, particularly China, continued to be the origin of trade conflicts and concerns about currency wars.

The persistence of transpacific global imbalances, in particular between the East Asian and oil exporting countries and the United States, but also the strengthening of trans-Atlantic current account imbalances between Germany (and some smaller northern European countries) and the United States as shown in the asymmetry matrix of global current accounts (Figure 1) has revived the discussion about the determinants and adjustment channels of global current account imbalances. In this context, in the spirit of Friedman (1953) exchange rate flexibility is perceived to play a pivotal role for current account adjustment. Furthermore as shown in Europe, curtailing public deficits has been at the core of policy measures to reduce current account deficits.

The literature on the determinants and adjustment channels of global imbalances has pursued different lines of reasoning. Chinn and Wei (2013) test Friedman's (1953) hypothesis that the exchange rate can act as an adjustment mechanism for current account imbalances. For a sample of 170 countries they do not find a robust correlation between exchange rate flexibility and current account reversion. Hermann and Jochem (2013) find some evidence for the adjustment of current account balances to exchange rate changes in the European Union. Gosh et. al. (2014), controlling for different degrees of exchange rate flexibility and bilateral exchange rate changes find a significant role of exchange rate changes for external adjustment.

A second strand of literature has tested for the macroeconomic determinants of current account positions with a focus on fiscal balances, which constitute with respect to the absorption approach an important component of current account balances. For instance, Abbas et al. (2010) find for a sample of more than 100 countries evidence in favor of the twin deficit (twin surplus) hypothesis, i.e. that the strengthening (worsening) of the public fiscal position is positively linked to the current account balance.

A third strand of literature has linked the global downward trend in interest rates since the 1980s to growing cross-border capital flows and rising current account imbalances. Freitag and Schnabl (2012) find a significant impact of relative monetary policy stances for current account positions in emerging market economies, contingent on sterilization policies. Schnabl and Wollmershäuser (2013) argue with focus on the strong current account divergence in Europe prior to the European debt crisis, that expansionary one-size monetary policy paired with divergent fiscal policy stances has been at the core of intra-European current account imbalances.

Merging these strands of literature is the main contribution of the paper. It tests for the impact of both exchange rates and macroeconomic policy stances on the current account positions of emerging market economies. As in the face of loose monetary policy conditions in the large industrialized countries and buoyant capital inflows into emerging market economies single country groups have developed different macroeconomic policy response patterns (Löffler et al. 2010) the emerging market sample is subdivided into four subgroups, i.e. East Asia, Latin America, Middle East and CIS (oil exporting countries) and the European periphery countries. The panel estimations reveal that macroeconomic policies relative to large industrialized reference countries seems to play a more important role than exchange rates for the evolution of current account balances. This implies that macroeconomic policy making is to be in the core of measures, if the current account adjustment is the objective.

## **2. Exchange Rate versus Macroeconomic Policy Adjustment**

The economic policy discussion on current account imbalances in emerging market economies has mainly focused on four regions: East Asia (in particular China), the oil exporting countries (as clustered in the Middle East and the CIS), Latin America and the European periphery countries (whose current account imbalances have behaved inversely to the current account balances of some central and northern European countries, in particular Germany).

The focal point of exchange rate-based current account adjustment continues to be the controversy about the Chinese-US current account imbalance. Since the emergence and rise of the Chinese current account surplus following the turn of the millennium the Chinese renminbi has been widely regarded as undervalued (e.g. Frankel 2006, Thorbecke and Smith 2010). Pressure has been put on China to (let) appreciate its currency to reduce the current account surplus (Bergsten 2013, Cline and Williamson 2012). The underlying theoretical argument is the Marshall-Lerner condition<sup>1</sup>, i.e. the elasticity approach to the trade balance, which assumes that a nominal and – given rigid prices – real appreciation of a currency reduces exports and stimulates imports thereby deteriorating the current account position.

The underlying assumptions of the elasticity approach, however, have been regarded as too rigid. Besides general criticism concerning the empirical validity of the Marshall-Lerner condition (see e.g. Rose 1991), Qiao (2007) stresses for China that nominal exchange rate changes have no systematic impact on aggregate saving and investment as macroeconomic determinants of the current accounts.<sup>2</sup> McKinnon and Schnabl (2006) show for Japan that the post-Plaza yen appreciation (of close to 50% against the dollar) failed to reduce the Japanese current account surplus. Although exports declined as yen appreciation-induced price effects were partially shifted to foreign currency (i.e. dollar) prices, imports declined as well due to the negative business cycle effects of yen appreciation.

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<sup>1</sup> The Marshall-Lerner condition can be traced back to Lerner (1944), who further developed the initial work by Marshall (1923). The condition states that a depreciation of the currency can have a positive effect on the trade balance if the sum of the export and import demand elasticities (in absolute values) exceeds one. In a two country model, the trade balance ( $B$ ) can be expressed as  $B = X(Y^*, \varepsilon) - M(Y, \varepsilon) \cdot \varepsilon$ , where  $X(Y^*, \varepsilon)$  represents the demand for exports which depends on the income of the foreign country ( $Y^*$ ) and the exchange rate ( $\varepsilon$ ).  $M(Y, \varepsilon)$  represents the demand for imports, which depends on the income of the home country ( $Y$ ) and  $\varepsilon$ . The exchange rate  $\varepsilon$  is expressed in direct quotation. The change of  $B$  due to an increase in  $\varepsilon$  (a depreciation of the currency) from which the Marshall-Lerner condition follows can be expressed as  $\frac{\partial B}{\partial \varepsilon} = \frac{\partial X(Y^*, \varepsilon)}{\partial \varepsilon} \cdot \frac{\varepsilon}{X} + \left| \frac{\partial M(Y, \varepsilon)}{\partial \varepsilon} \cdot \frac{\varepsilon}{M} \right| - 1$ .

<sup>2</sup> The current account CA defined as exports minus imports is equivalent to the aggregated savings  $S$  minus investment  $I$ :  $CA = X - M = S - I$ . This identity as derived by Alexander (1952) always holds.

Therefore, macroeconomic policies have gained growing attention concerning the role for the evolution of East Asian current account positions. To explain the emergence, persistence, and growth of the East Asian current account surpluses following the Asian crisis, Freitag and Schnabl (2012) point to tight monetary policy stances relative to the US (as anchor country). Whereas the US have tended to pursue a relatively loose monetary policy thereby stimulating domestic investment and depressing both household and public saving, China and most other East Asian countries have faced buoyant capital inflows and appreciation pressure on their currencies. This has not only triggered extensive exchange rate stabilization<sup>3</sup> but also sterilization operations to mop up the liquidity creation of foreign reserve accumulation. The result was a rise in Chinese and East Asian household and enterprise saving, whereas lending restrictions originating in the growth of non-market-based reserve requirements (i.e. sterilization policies) put a drag on domestic investment activity.

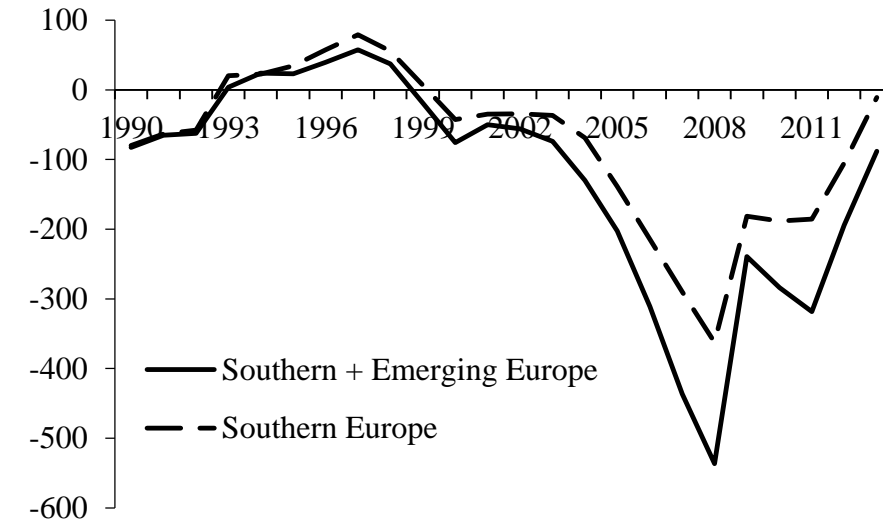
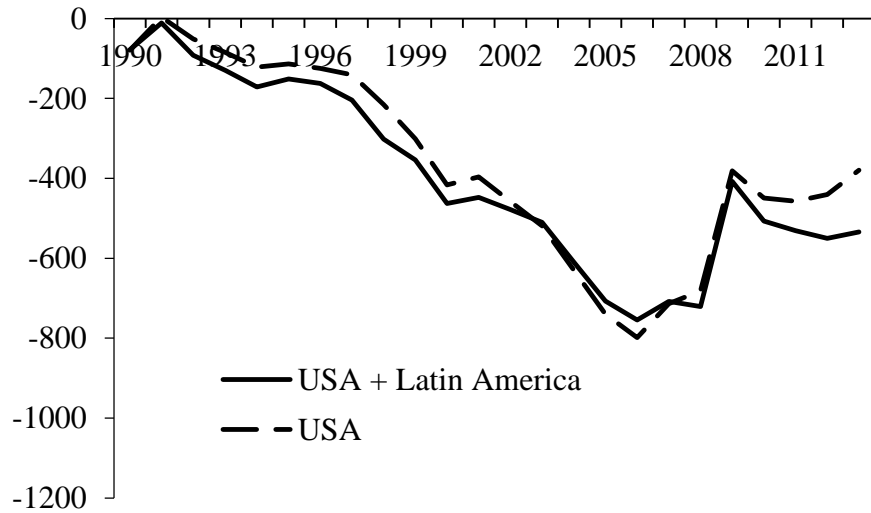
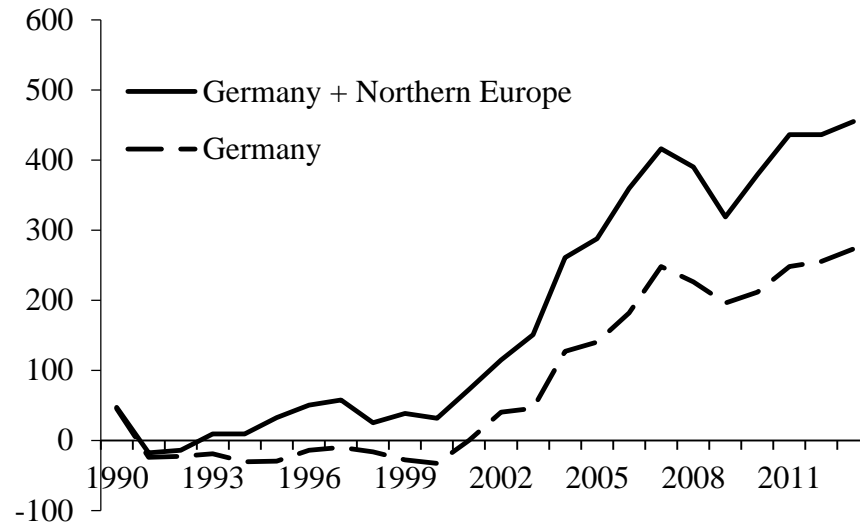
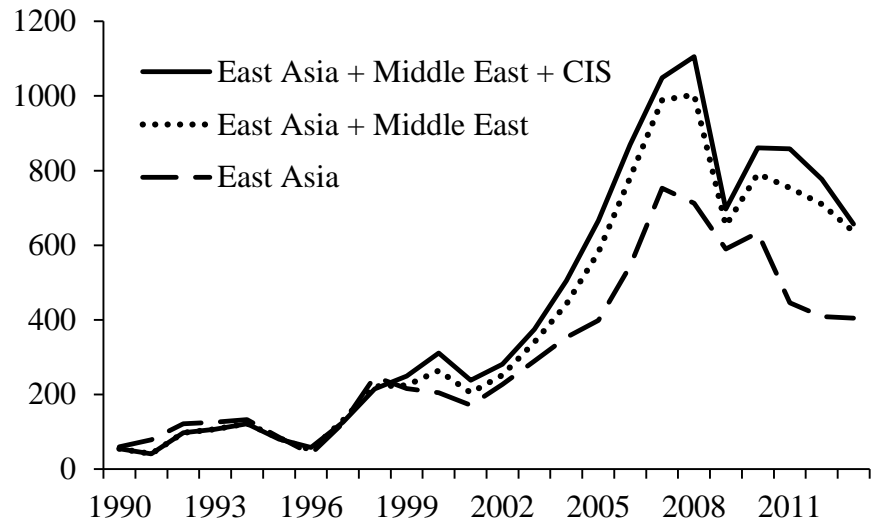
In the oil exporting countries (as clustered in the Middle East and the Commonwealth of Independent States (CIS)), the emergence of large and persistent current account surpluses is linked to the hike of oil and raw material prices after the turn of millennium (Blanchard and Milesi-Ferretti 2010, Bems and de Carvalho Filho 2011). Because the oil and raw material sectors tend to be owned or highly taxed by governments, fast rising current account surpluses (as shown in Figure 1) were matched by strongly rising government budget surpluses (twin surpluses). As tight exchange rate stability against the dollar is – given the predominant dollar invoicing in oil trade – widely accepted as a strategy to stabilize national incomes in the face of volatile oil prices (Wills and van der Poeg 2014), exchange rate appreciation has not been regarded as a viable tool of current account adjustment.

Because the oil exporting countries tended to sterilize the surge of foreign exchange inflows by fast growing government deposits with the central bank (Löffler et al. 2010), the large

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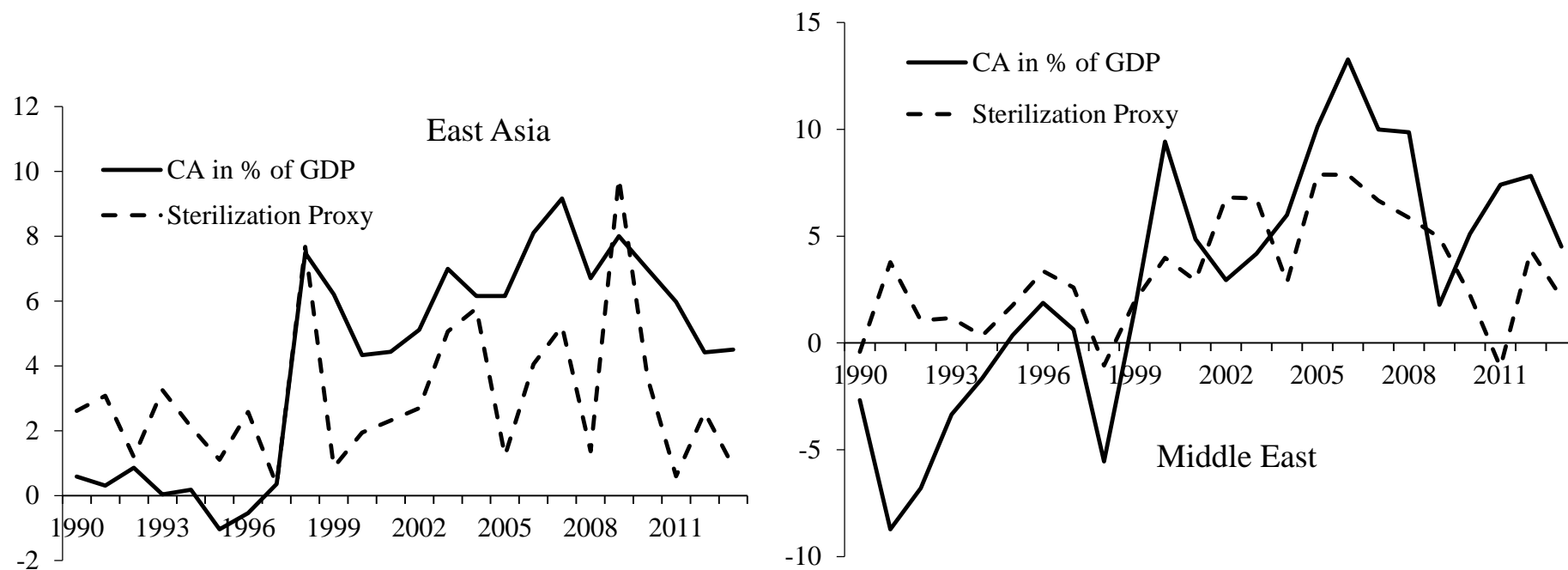
<sup>3</sup> For the motivations to stabilize the exchange rates against the dollar see McKinnon (2013).

**Figure 1: Asymmetry Matrix of Global Current Accounts**



Source: IMF. Y-axes indicate billions of dollars.

**Figure 2: Sterilization and Current Account Balance in East Asia, Middle East and CIS**



Source: IMF. Arithmetic averages.



current account surpluses can be understood as the outcome of de facto diverging monetary and fiscal policies relative to oil and raw material importing countries. Therefore, similarly as in East Asia the sterilization operations are closely linked to the evolvement of current accounts (see Figure 2).

In the Latin American countries the current account imbalances tended to improve since the late 1990s up to the year 2006 on the back of macroeconomic tightening. Some Latin American countries such as Brazil and Chile even ran current account surpluses in some years. However, since the year 2007 the current account balances have – despite substantial heterogeneity in the region – tended to deteriorate. Buoyant capital inflows were allowed to be translated into substantial appreciations of the domestic currencies. Growing reserve accumulation (despite exchange rate appreciation) was sterilized to a lower extent than in the East Asian countries, what contributed to further real exchange rate appreciation and therefore rising current account deficits. The introduction of capital controls such as in Brazil could only partially soften the appreciation pressure on the Latin American currencies.

With respect to Europe, the discussion about the adjustment of the intra-European current account imbalances is a relatively new issue on the economic policy agenda, mainly evolving during the European debt crisis since the year 2008. Strongly asymmetric current account patterns in Europe have emerged in the run-up to the crisis mainly on the basis of fixed exchange rates or EMU membership. Fast rising current account deficits in many southern, western, eastern and central European countries were matched by a fast rising current account surpluses of some central and northern European economies, in particular Germany (Jaumotte and Sodsriwiboon 2010).

During the crisis Iceland (and to a certain extend the United Kingdom) experienced a significant exchange rate depreciation accompanied by a substantial decline of the current account deficit. Some authors recommended that the southern European member states should exit from the European Monetary Union to improve their current account deficits via exchange rate depreciation (Roubini 2011). However, as the exchange rates are regarded as mainly given due to irrevocable or future membership in the European Monetary Union the discussion concerning the adjustment of current account imbalances became centered around fiscal austerity measures (Gabrisch and Staehr 2014).

Public austerity during the crisis went along with a decline of domestic absorption (government expenditure, consumption, investment, import demand), which led to a convergence of the crisis countries' current account deficits towards zero via mainly the import-demand channel (see lower right panel of Figure 1). As during this adjustment process, the fiscal policy stance of Germany (and some smaller northern European countries) has remained unchanged, the German current account surpluses became redirected towards third countries such as the US, UK and France.

Schnabl and Wollmershäuser (2013) point to the role of the macroeconomic policy mix for the emergence of intra-European current account imbalances. They argue that following 2001 strong ECB interest rate cuts were translated into rising current account deficits or surpluses depending on the fiscal policy stance. Germany (and some smaller northern European countries) paired the common expansionary monetary policy with tight fiscal policy stances, what favored capital outflows and rising current account surpluses. In contrast, the growing capital inflows encouraged public spending and rising consumption in many countries at the periphery of the European (Monetary) Union thereby contributing to fast growing current deficits.

All in all, the determinants of global imbalances seem to be heterogeneous. To provide further evidence we embark on an empirical estimation for 86 mainly emerging market economies. Some industrialized countries are included into the country groups as they exhibit similar structural characteristics concerning the current account as for instance Japan in East Asia. The western European industrialized countries are included in the sample as reference model for (what is called) periphery Europe. In contrast to previous studies, we test for both the exchange rates and relative macroeconomic policy stances as determinants of current account positions. In particular also the policy mix of monetary and fiscal policy is included.

### **3. Data and Estimation Framework**

Table 1 lists the 86 mostly emerging market economies by country group. Data sources are the International Monetary Fund International Financial Statistics and World Economic

**Table 1: Country Groups**

<b>Region</b>	<b>Countries</b>
Latin America (\$)	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela.
East Asia 10 (\$)	China, Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan, Thailand.
Middle East (\$)	Algeria, Bahrain, Egypt, Israel, Jordan, Kuwait, Lebanon, Libya, Oman, Saudi Arabia, Syria, Yemen.
CIS (\$)	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Ukraine.
Emerging, Southern and Western Europe (€) (Periphery Europe)	Albania, Bosnia, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, France, Greece, Italy, Hungary, Ireland, Iceland, Latvia, Lithuania, Macedonia, Malta, Morocco, Poland, Portugal, Spain, Romania, Slovak Republic, Slovenia, Tunisia, Turkey, United Kingdom.
Germany and Northern Europe (€) (Core Europe)	Austria, Belgium, Denmark, Finland, Germany, Netherlands, Norway, Sweden, Switzerland.

The currency servicing as an anchor for exchange rate stabilization is indicated in brackets.

Outlook as well as national central bank statistics. The overall sample is decomposed into single regional subgroups, which – despite certain heterogeneity – have common macroeconomic structural characteristics, for instance due to strong regional integration. The overall sample is decomposed into East Asia, Middle East and CIS (representing oil exporting countries), Latin America, as well as Emerging, Southern and Western Europe representing European countries with a tendency towards currency account deficits (labeled periphery Europe). Germany and some northern European countries representing those countries of the region with a tendency towards current account surpluses (labeled core Europe) are used as reference group for periphery Europe.<sup>4</sup> To mainly capture the period of global monetary expansion, rising international capital flows and the emergence of global imbalances (see Figure 1) the sample starts in 1990 extending up to the present (2013).

The endogenous and exogenous variables are described in Table 2. The current account positions, the endogenous variable, is normalized and presented as percent of GDP (cagdp). We use de facto exchange rate flexibility measures because de jure volatility measures tend to be biased due to *fear of floating* (Calvo and Reinhart 2002). Given that non-intervention in the foreign exchange market would imply a high degree of exchange rate flexibility/volatility, most countries (except the large industrialized countries) intervene in the foreign exchange markets to reduce exchange rate volatility to a desired level. Two types of exchange rate flexibility measures are computed. First, standard deviations of month-over-month exchange rate changes of the respective year are calculated as measure for exchange rate flexibility (erflex). Year-over-year changes of the nominal exchange rate (erchange) aim to capture the role of the exchange rate as an adjustment mechanism in the sense of the elasticity approach to the current account.

The fiscal policy stances are proxied by general budget deficits as percent of GDP (govbal). Because budget deficits for most countries in the sample are only available on a yearly basis this variable restricts the frequency of the estimations to yearly observations. The monetary policy stance is in most cases represented by money market rates (mmr). For countries, where money market rates are not available, treasury bill rates, bank deposit rates or lending rates are used instead.

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<sup>4</sup> For a similar classification of the European countries see Lane and Milesi-Ferretti (2014).

**Table 2: Data Description**

Acronym	Description	Source
<i>cagdp</i>	Current account balance as percent of GDP. Negative (positive) values stand for a current account deficit (surplus).	World Economic Outlook
<i>govbal</i>	Government balance as percent of GDP. Negative (positive) values stand for a government budget deficit (surplus).	World Economic Outlook
<i>mmr</i>	Money market rate indicating the monetary policy stance. If the money market rate is not available, other short-term interest rates are used prioritizing the alternatives by availability according to the following ranking: 1. Money market rate (60B..), if not available 2. Treasury bill rate (60C..), if not available 3. Bank/Deposit rate (60...), if not available 4. Lending rate.	IMF International Financial Statistics
<i>erflex</i>	Exchange rate flexibility. Measured as the standard deviation of the exchange rate's month-over-month changes versus the reference currency in each year. The euro/D-mark is the reference currency for European countries. With membership in the EMU the value is set to zero. The dollar is the reference currency otherwise. For the US the reference currency is the euro (DM), for Germany the reference currency is the US dollar.	IMF International Financial Statistics (IFS)
<i>erchange</i>	Exchange rate change. Measured as percent change versus the previous year. The euro/D-Mark are the reference currencies for European countries. With membership in the EMU the value is set to zero. The dollar is the reference currency otherwise. For the US the reference currency is the euro (DM), for Germany the reference currency is the US dollar.	IMF International Financial Statistics (IFS)
<i>steril</i>	Sterilization variable calculated based on central bank balance sheet data as the difference between foreign reserve holdings and currency in circulation normalized by nominal GDP.	IFS and WEO
<i>expans_dum</i>	Dummy for (relative) expansive fiscal policy which takes the value of 1 if the government deficit is higher than the world average in each year and 0 otherwise.	
<i>mmr*expans_dum</i>	Interaction term for fiscal and monetary policy. The variable is the multiplication of <i>mmrate</i> and <i>govexpans</i> .	

The sterilization operations of monetary authorities are proxied by central bank holdings of foreign reserves minus currency in circulation normalized by nominal GDP (all in domestic currency) (steril). This approximation acknowledges the fact that since the 1990s, and in particular since the turn of the millennium liquidity creation in emerging market economies has been mainly driven by foreign reserve accumulation (Löffler et al. 2010). With currency in circulation being assumed to be the only liquidity absorbing autonomous factor on the liability side of the central bank balance sheet, the difference between foreign reserve holdings and currency in circulation can be understood as a proxy for sterilization operations.

In context of globally rather loose monetary conditions, in many cases monetary expansion paired with fiscal expansion has become the breeding ground of domestic financial market exuberance, rising inflation and rising current account deficits. In contrast, in countries with relative tight fiscal policy stances such as Germany after the turn of the millennium the current account positions have tended to improve substantially (see section 2). To disentangle the impact of globally loosening monetary conditions on the current accounts contingent on the fiscal policy stance, we compute a dummy for relative expansionary fiscal policies (expans\_dum). The dummy is set to one, if the budget deficit of a specific country in a specific year is larger than the average of the overall sample. Otherwise, it is zero.

**Table 3: Transition Frequency: Dummy Expansive Fiscal Policy**

Dummy Expansive Fiscal Policy (Initial Values)	Dummy Expansive Fiscal Policy (Final Values)		Total
	0	1	
0	809	171	980
	82.55	17.45	100
1	138	778	916
	15.07	84.93	100
Total (in percent)	947	949	1,896
	49.95	50.05	100

The test for the effect of the macroeconomic policy mix on the current account positions of emerging market economies is a specific innovation of the paper. The money market rate multiplied with the dummy for relative expansionary fiscal policies is labeled “mmr\*expans\_dum”. Table 3 shows the transition frequency of the dummy variable for

expansive fiscal policy. In 85% of the cases in which a country had an expansive fiscal policy, the fiscal policy remained expansive for the next period and only in 15% of the cases it turned contractive. In 83% of the cases in which the fiscal policy was not expansive, it remained non-expansive for the next period, while in 17% of the cases it turned expansive.

**Table 4: Descriptive Statistics**

Variable		Mean	Std. Dev.	Min	Max	Observations
<i>cagdp</i>	overall	-0.96	8.76	-56.70	51.10	N = 1927
	between		6.62	-18.81	26.10	n = 86
	within		5.80	-38.85	34.89	T-bar = 22.407
<i>govbal</i>	overall	-1.51	5.94	-49.58	43.30	N = 1665
	between		4.08	-11.73	17.24	n = 86
	within		4.27	-68.32	24.56	T-bar = 19.3605
<i>mmr</i>	overall	7.89	11.23	-0.08	91.95	N = 1937
	between		7.13	0.14	41.83	n = 86
	within		8.80	-33.94	78.70	T-bar = 22.5233
<i>erchange</i>	overall	8.00	39.03	-21.56	720.41	N = 1937
	between		14.62	-1.77	72.83	n = 86
	within		36.43	-65.28	684.79	T-bar = 22.5233
<i>ervol</i>	overall	1.70	3.66	0.00	64.50	N = 1937
	between		1.29	0.00	5.93	n = 86
	within		3.43	-4.15	60.75	T-bar = 22.5233
<i>steril</i>	overall	-0.03	0.74	-13.25	0.39	N = 1842
	between		0.72	-6.70	0.12	n = 86
	within		0.45	-6.59	6.71	T-bar = 21.4186

Table 4 reports the summary statistics. The variation of the endogenous variable *cagdp* comes almost equally from a variation over time (within) and from cross-country variation. For all the other variables, except for the sterilization proxy (*steril*) a higher portion of the total variation is due to variation over time than to cross-section variation. As argued by Chinn and Prasad (2003) relatively low within variation would imply that a cross-country estimation on the averages over the complete observation period would be a more appropriate estimation procedure. In our case, however, both the within and the between variation seem to be relevant. To capture the variation over time and across countries we choose panel estimations.

Panel unit root tests for unbalanced panels (Im–Pesaran–Shin (IPS), Fisher-ADF, Fisher-Phillips Perron) do not provide evidence in favour of non-stationarity. The IPS test, which is based on an augmented Dickey-Fuller test, is suitable for our data structure as it allows for group-specific autoregressive parameters and therefore allows for country heterogeneity. As the Fisher tests perform a unit root test for each panel, they also encounter for country heterogeneity. In all cases the null hypothesis is that all panels contain unit roots against the alternative that at least one panel is stationary. We select the optimal lag-length for the IPS test according to the Schwarz information criterion (BIC). The maximum lag-length for making the selection was 4. For the Fisher tests we use 3 lags. The results are not sensible to different lag-lengths. For all Fisher tests we include a drift parameter as the mean of each variable for each country is non-zero. In all cases the null hypothesis is rejected at the usual significance levels.

To estimate the influence of the exchange rate, fiscal and monetary policy variables on the current account balances taking into account the variation in time we estimate pooled ordinary least squares models (OLS) and generalized least squares models (GLS) for the whole sample (world) and for each of the regions separately interchanging *erflex* with *erchange*. The benchmark pooled OLS-regression is specified as follows:

$$cagdp_{it} = \alpha + \beta_1 steril_{it} + \beta_2 erflex_{it}(erchange_{it}) + \beta_3 govbal_{it} + \beta_4 mmr_{it} + \beta_5 mmr_{it} * expans dum_{it} + \mathcal{E}_{it} \quad (1)$$

where  $\alpha$  represents a common intercept for all countries within each region,  $\beta_1$  to  $\beta_5$  the coefficients of the contemporaneous control variables and  $\mathcal{E}_{it}$  the error term.

Even though the countries of each subgroup have common characteristics they are not completely homogenous. To take the time invariant country heterogeneity into account we also estimate a GLS model with country fixed effects as specified in equation 2, where  $\alpha_i$  is a country specific intercept and  $u_{it}$  the error term.<sup>5</sup>

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<sup>5</sup> We choose a fixed effects model instead of a random effects model as the Hausman specification test rejects the null hypothesis that the individual effects are properly modeled by the random effects specification.



$$cagdp_{it} = \alpha_i + \beta_1 steril_{it} + \beta_2 erflex_{it}(erchange_{it}) + \beta_3 govbal_{it} + \beta_4 mmr_{it} + \beta_5 mmr_{it} * expans dum_{it} + u_{it} \quad (2)$$

All models are estimated with heteroskedasticity robust standard errors.

The OLS and GLS estimations follow the assumption that fiscal, monetary and exchange rate policies are exogenous and current account balances adjust. There is, however, possible reverse causality, because current account positions may induce changes in macroeconomic policy making. To encounter reverse causality concerns, we estimate the OLS and GLS models described above with explanatory variables lagged by one period. This approach allows us to exclude any reverse contemporaneous effect of the current account balance on the right hand side variables.

We finally estimate the following Arellano-Bond panel GMM model as an additional approach to encounter endogeneity concerns:

$$cagdp_{it} = \alpha_p + a_1 cagdp_{it-1} + a_2 cagdp_{it-2} + \beta_1 steril_{it} + \beta_2 erflex_{it}(erchange_{it}) + \beta_3 govbal_{it} + \beta_4 mmr_{it} + \beta_5 mmr_{it} * expans dum_{it} + \epsilon_{it} \quad (3)$$

where  $a_p$  are the coefficients of the  $p$  lags of the endogenous variable and  $\epsilon_{it}$  the error term. We assume all right hand side variables to be endogenous and instrument them with their lags. We restrict the number of lags to 2 to keep the number of instruments low due to the fact that for most of the regressions the time dimension is larger than the cross-section dimension (Roodman 2009). We estimate the model using a heteroskedasticity robust two-step procedure and applying the finite sample correction proposed by Windmeijer (2005).

The estimation results are presented in Tables 5 to 10.

**Table 5: Cross Section Regression: OLS with Exchange Rate Flexibility Measure, Average of 1990 – 2013**

	(1) World	(2) East Asia	(3) Middle East + CIS	(4) Latin America	(5) Periphery Europe	(6) Core Europe
(mean) steril	-0.887*** [0.112]	264.2** [76.38]	-15.96 [36.05]	-0.727** [0.272]	35.54 [158.5]	-87.40 [187.9]
(mean) ervol	-0.196 [0.420]	3.588* [1.569]	0.919 [1.293]	0.962 [0.933]	-1.245* [0.708]	-0.259 [0.957]
(mean) govbal	1.041*** [0.155]	0.0790 [0.248]	1.120*** [0.231]	0.381 [0.605]	0.433 [0.477]	0.648* [0.184]
(mean) mmr	-0.162* [0.0875]	-0.703** [0.247]	-0.548 [0.377]	-0.0298 [0.0795]	0.0226 [0.0776]	0.0250 [2.221]
Observations	86	10	22	18	29	7
$R^2$	0.501	0.895	0.687	0.306	0.133	0.744
$AIC$	518.3	46.74	145.6	107.9	162.7	32.69

Standard errors in brackets

 $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 6: Cross Section Regression: OLS with Exchange Rate Changes, Average of 1990 – 2013**

	(1) World	(2) East Asia	(3) Middle East + CIS	(4) Latin America	(5) Periphery Europe	(6) Core Europe
(mean) steril	-0.913*** [0.0795]	110.3 [97.28]	-8.525 [34.97]	-0.894** [0.319]	-33.83 [144.2]	-178.3 [195.4]
(mean) erchange	-0.0372 [0.0337]	0.161 [0.335]	0.00483 [0.0611]	0.0441 [0.141]	0.00675 [0.0850]	-1.869 [1.225]
(mean) govbal	1.047*** [0.154]	0.464 [0.472]	1.102*** [0.243]	0.419 [0.670]	0.287 [0.476]	0.721** [0.152]
(mean) mmr	-0.138 [0.0861]	-0.596 [0.416]	-0.383 [0.286]	-0.0125 [0.116]	-0.0840 [0.150]	1.017 [1.616]
Observations	86	10	22	18	29	7
$R^2$	0.505	0.767	0.669	0.285	0.053	0.816
$AIC$	517.7	54.73	146.8	108.5	165.3	30.38

Standard errors in brackets

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

#### 4. Estimation Results

Tables 5 and 6 report the cross-section estimation results, which isolate the cross section dimension of the sample thereby minimizing endogeneity issues (see for instance Chinn and Prasad 2003). The results are most conclusive for the overall sample, which comprises a larger variation. For both, the estimation with exchange rate changes and the exchange rate flexibility measure fiscal policies seem to play a significant role for current account determination. In average for all countries a one percentage-point deterioration of the budget deficit is linked to a one-percentage point deterioration of the current account balance. Furthermore, the declining interest rate levels are linked in average to improved current account positions (statistically significant at the 10% level with standard deviations as exchange rate flexibility measure).

The link between declining interest rates and improving current account positions of many emerging market economies may reflect the fact that the growth of the US current account deficit since 1990 has been linked to an increasing number of emerging market economies being transformed into current account surplus countries (Freitag and Schnabl 2012). The sterilization proxy turns out to be significant at the one percent level, but with the unexpected sign, i.e. sterilization operations are associated with worsening current account positions for the overall sample. Exchange rate changes and exchange rate flexibility as determinants of current account balances remain statistically insignificant.

From a country-group perspective there is no comprehensive picture on the determinants of current account positions of emerging market economies. For East Asia interest rate cuts combined with sterilization operations seem to play a role improving current account positions when standard deviations are used as exchange rate flexibility measures. For the Middle East and the CIS, representing oil exporting countries, the government budget balances (which can be also seen as a proxy for oil (and gas) prices) have an highly statistical significant impact on current account imbalances, associating improving budget balances with improving current account positions (twin surpluses). In case of the Latin American countries only the sterilization coefficient turns out significant, but with the unexpected sign. For periphery Europe there is no robust evidence for a specific impact of any macroeconomic variable on current account positions from this pure cross-section perspective. In core Europe

there is statistically significant evidence that budget balances are positively linked to current account positions.

Although the cross-section estimations provide first evidence for the determinants of current accounts in emerging markets, they do not explore the time dimension. The time dimension is important for the development of current account positions of emerging market economies, as many emerging market countries groups have experienced structural breaks in current account development. East Asia following the 1997/98 Asian crisis, Middle East and CIS after the turn of the millennium, Latin America since 2007, and Periphery Europe after the turn of the millennium and since 2008 (see section 2). For this reason we perform OLS and GLS estimations to explore both the time and the cross-country dimension of the macroeconomic policy determinants of current account positions in emerging market economies.

The results of the baseline OLS regression are reported in Table 7.<sup>6</sup> There is rather robust evidence that regional current account positions are driven by macroeconomic policy stances rather than by exchange rate adjustment. In East Asia, the impact of exchange rate changes on the current account positions is insignificant despite growing exchange rate flexibility since the Asian crisis. Instead sterilization operations are associated with current account surpluses at a statistical significance level of one percent. Similarly, the government budget balances are linked to the current account positions. A one percentage point improvement of the budget deficits is linked a 0.5 percentage point improvement of the current account positions (significant at the one percent level). The structural decline of interest rates in East Asia seems to have been accompanied with improved current accounts, in particular for countries with relative tight fiscal policies. For countries with relative expansionary fiscal policies the effect has the same sign but a substantially smaller coefficient.

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<sup>6</sup> We only report the results for exchange rate changes as the results for exchange rate changes and standard deviations of exchange rate changes are very similar and the Akaike information criteria (AIC) suggest that these estimations have a slightly better fit. The results with standard deviations as exchange rate flexibility measures can be provided upon request.

**Table 7: Baseline Regression: Pooled OLS with Exchange Rate Changes, 1990 - 2013**

	(1) World	(2) East Asia	(3) Middle East + CIS	(4) Latin America	(5) Periphery Europe	(6) Core Europe
steril	-0.977*** [0.118]	33.62*** [10.93]	21.70** [8.770]	-1.189*** [0.119]	0.543 [8.791]	13.75 [11.67]
erchange	0.0284* [0.0160]	-0.0105 [0.0356]	0.00617 [0.0114]	0.0835*** [0.0157]	-0.0227 [0.0598]	-0.0808* [0.0411]
govbal	0.884*** [0.0580]	0.453*** [0.113]	0.983*** [0.0983]	0.759*** [0.107]	0.0342 [0.0938]	0.568*** [0.0763]
mmr	-0.290*** [0.0404]	-0.601*** [0.134]	-0.163*** [0.0474]	-0.122*** [0.0346]	-0.331*** [0.106]	-0.604*** [0.111]
mmr * expans_dum	0.247*** [0.0417]	0.526*** [0.146]	0.182** [0.0881]	0.124*** [0.0371]	0.265** [0.103]	0.423*** [0.113]
Observations	1617	221	344	317	556	155
Adjusted $R^2$	0.364	0.308	0.593	0.292	0.027	0.410
<i>AIC</i>	10783.9	1380.1	2451.9	1837.5	3480.4	791.8

Standard errors in brackets

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

For the group of (predominantly) oil exporting countries the exchange rates – which tend to be rigidly pegged to the dollar – do not have any significant impact on the current account balances. Instead sterilization operations (here predominantly based on government deposits at the central bank) turn out highly significant with respect to their impact on the current accounts. Similarly the twin surplus hypothesis is confirmed: An increase in the government budget surplus by 1 percentage point is accompanied by an increase (decline) of the current account surplus (deficit) by 1 percentage point (significant at the one percent level). Lower interest rates are linked to improved current account positions for countries with relative tight fiscal policies stances, whereas for countries with relative expansionary fiscal policy stances interest rate cuts are associated with worsening current account positions.

In Latin America current account balances seem to be driven by both exchange rate and macroeconomic policies. Exchange rate depreciations (appreciations) contributed at statistically significant levels to improved (worsening) current account positions. Rising government budget deficits are linked to worsening current account positions (significant at the 1% level). Expansionary monetary policies (i.e. interest rate cuts) are associated with improving current account positions for Latin American countries with comparatively tight fiscal policies. This effect is – as indicated by the interaction term – inversed for Latin American countries with relatively expansionary fiscal policies. Expansionary monetary policy is for these countries associated with worsening current account positions. The proxy for sterilization operations is again highly significant, but has an inversed sign. This may indicate that sterilization operations are ineffective in slowing down inflation, financial market exuberance and real appreciation.

In Southern, Western and Emerging Europe (Periphery Europe) the current account positions seem to be mainly driven by monetary policy stances and by the monetary and fiscal policy mix. Interest rate cuts are associated with improved current accounts for countries with relative tight fiscal policies. For countries with relatively expansionary fiscal policies this effect goes into the same direction, but is much less pronounced. To this end, the OLS regression does not provide sufficient evidence to explain the substantially rising current account deficits in periphery Europe, in particular after the turn of the millennium.

In contrast, in Germany and the smaller northern European countries, which historically tended towards current account surpluses, nominal exchange rate appreciation (depreciation)

is associated with improving current account positions, what is in contradiction to the elasticity approach. Both fiscal and monetary policies have a statistically significant impact on the current account positions. Lower budget deficits are linked to improved current accounts (significant at the one percent level). Lower interest rates go within improved current accounts for countries with relative tight fiscal policy stances. This effect is substantially smaller for countries with relatively expansionary fiscal policy stances.

For the aggregated sample of all country groups all explanatory variables are significant at the common levels of statistical significance, albeit the sterilization proxy does not have the expected sign. Fiscal policies have a statistically significant impact on current accounts. Depreciation is associated with improving current accounts (significant at the 10% level). Declining interest rates are associated with improving current accounts with the dimension of the effect seeming contingent on the fiscal policy stance. This finding is in line with the fact that since the 1990s the growing US current account deficit has been matched by a growing number of current account surpluses of emerging markets and some industrialized countries such as Germany and Japan.

The robustness tests are presented in Table 8 to Table 10. Fixed-effects GLS estimations aim to control for country specific time-invariant factors (Table 8). By controlling for time invariant country heterogeneity, the AIC criteria suggest that the fixed-effects model has a better fit for all cases compared to the pooled OLS case in Table 7. The trade-off, however, are the fewer degrees of freedom which become particularly important for the regions with the least observations. Whereas for the overall sample the results remain widely unchanged, for the single country groups some region-specific macroeconomic explanatory variables for current account positions become insignificant. In particular for East Asia only the sterilization operations remain associated with current account positions (coefficient significant at the 5% level).



**Table 8: GLS, Fixed Effects with Exchange Rate Changes, 1990-2013**

	(1) World	(2) East Asia	(3) Middle East + CIS	(4) Latin America	(5) Periphery Europe	(6) Core Europe
steril	-0.513*** [0.160]	24.10** [7.455]	25.76*** [8.863]	-0.710*** [0.0864]	0.215 [7.021]	16.06 [8.370]
erchange	0.0140* [0.00752]	0.00284 [0.0408]	0.00639 [0.00958]	0.0677*** [0.0200]	-0.0422 [0.0550]	-0.0857** [0.0297]
govbal	0.520*** [0.0982]	-0.488 [0.288]	0.702*** [0.142]	0.645** [0.223]	-0.135 [0.0846]	0.501*** [0.128]
mmr	-0.160** [0.0692]	-0.319 [0.202]	-0.0407 [0.0650]	-0.118** [0.0409]	-0.126 [0.0957]	-0.694*** [0.0984]
mmr * expans_dum	0.176*** [0.0621]	0.210 [0.146]	-0.00199 [0.0548]	0.0890** [0.0376]	0.189* [0.102]	0.495*** [0.128]
Observations	1617	221	344	317	556	155
AIC	9662.6	1263.0	2256.4	1600.0	3106.0	742.5

Standard errors in brackets

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

For the Middle East and the Commonwealth of Independent States sterilization operations combined with government budgets (mainly surpluses since the turn of the millennium) are identified as determinants of current account positions at the common levels of statistical significance. For the Latin American countries the results remain roughly unchanged: Fiscal positions, monetary conditions, exchange rate changes and the macroeconomic policy mix seem to be important determinants of current account positions. Also the sterilization proxy turns out statistically significant at the one percent level, albeit again with the unexpected sign.

For the European periphery only for countries where expansionary monetary policy is paired with expansionary fiscal policy, interest rate cuts contribute to rising current account deficits, as it was the case in the later current crisis countries of the European (Monetary) Union. For core Europe as the control group for periphery Europe the rising (shrinking) budget deficits are associated with worsening (improving) current account positions (statistically significant at the 5% level). Expansionary monetary policy is associated with improving current account positions, while this effect is significantly smaller for European core countries with relative expansionary fiscal policies. Appreciation is associated with improved current account positions (coefficient significant at the 5% level).

Assuming that fiscal, monetary and exchange rate policy making are exogenous and current accounts adjust allows for OLS and GLS fixed effect models. If it is assumed that current account positions have an impact on macroeconomic policy making, lagging the explanatory variables can control for the endogeneity bias. The estimation results for the benchmark OLS estimation with lagged exogeneous variables are presented in Table 9. The AIC criteria suggest, that the model with the lagged control variables has a better fit than the benchmark model (while the results remain widely unchanged).

The main difference is that now the sterilization proxy turns out statistically significant for East Asia. Macroeconomic policy making – fiscal policy, monetary policy and the fiscal and monetary policy mix – has a highly significant impact on current account positions both on a global and a regional level. In contrast exchange rate changes do not turn out statistically significant for most country groups. The exchange rate coefficient is only statistically significant for Latin America, where exchange rate depreciation is associated with an

improved current account position (significant at the 5% level). This result is also reflected in the overall (world) sample.

To further control for the endogeneity bias we apply an Arellano-Bond dynamic panel GMM estimation framework. The results presented on table 10 are broadly in line with the lagged estimations for the overall sample. The results for the sub-groups are mainly insignificant, what can be due to the fact that the cross-country dimension is small compared to the time dimension. Furthermore, as reported in the lower part of the table, the null hypothesis of the Sargan-test for overidentifying restrictions, that instruments are exogenous in all specifications, cannot be rejected only in the regressions for East Asia, Latin America and Core Europe. The Hansen-test, however, reports implausible p-values (1.0) for all specifications, indicating that the number of instruments is too large (Roodman 2006). Additionally, the Arellano-Bond test for second order autocorrelation rejects the null hypothesis of no autocorrelation only in the first three models. This implies that the results of the GMM-estimations have to be treated with caution and that the endogeneity problem can not be fully resolved.

**Table 9: OLS Baseline Regression with Exchange Rate Changes and Lagged Explanatory Variables, 1990-2013**

	(1) World	(2) East Asia	(3) Middle East + CIS	(4) Latin America	(5) Periphery Europe	(6) Core Europe
L.steril	-0.864*** [0.145]	18.89* [10.99]	8.512 [11.69]	-1.094*** [0.156]	-11.79 [9.103]	28.94** [12.67]
L.erchange	0.0277* [0.0166]	0.0264 [0.0380]	0.00789 [0.0145]	0.0561*** [0.0168]	0.0528 [0.0436]	-0.0584 [0.0423]
L.govbal	0.769*** [0.0718]	0.509*** [0.106]	0.869*** [0.124]	0.516*** [0.122]	-0.0537 [0.0870]	0.483*** [0.0889]
L.mmr	-0.253*** [0.0431]	-0.492*** [0.142]	-0.166*** [0.0555]	-0.0671* [0.0386]	-0.312*** [0.109]	-0.549*** [0.128]
L.mmr * expans_dum	0.220*** [0.0450]	0.331** [0.157]	0.234** [0.110]	0.0813** [0.0412]	0.225** [0.101]	0.408*** [0.124]
Observations	1533	211	325	298	527	149
Adjusted $R^2$	0.269	0.216	0.407	0.195	0.033	0.305
AIC	10487.0	1344.5	2451.8	1758.0	3312.4	785.0

Standard errors in brackets

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Tabel 10: GMM Estimation with Exchange Rate Changes, 1990-2013**

	(1)	(2)	(3)	(4)	(5)	(6)
	World	East Asia	Middle East + CIS	Latin America	Periphery Europe	Core Europe
L.cabal	0.666*** [0.0591]	0.187 [0.239]	0.626*** [0.147]	0.361 [0.221]	0.855*** [0.109]	-1.294 [2.954]
steril	-0.152 [0.496]	-9.165 [29.78]	16.90 [19.83]	8.128 [9.940]	10.96 [7.108]	-729.7 [862.0]
erchange	0.0315* [0.0176]	-0.00750 [0.0665]	0.0221 [0.0317]	0.0830 [0.0727]	-0.00306 [0.0337]	-0.707 [0.776]
govbal	0.405*** [0.0979]	-0.125 [0.759]	0.518** [0.190]	0.940 [1.089]	-0.245 [0.148]	1.273 [1.218]
mmr	-0.115*** [0.0366]	0.313 [0.358]	-0.0247 [0.0613]	-0.504 [0.303]	0.0164 [0.177]	-3.288 [1.799]
mmr * expans_dum	0.114*** [0.0306]	0.0385 [0.282]	0.0679 [0.254]	0.425* [0.238]	-0.0749 [0.176]	8.536 [5.904]
Constant	0.845*** [0.292]	-0.122 [3.643]	-0.370 [1.262]	0 [0]	-1.031 [0.662]	-3.066 [2.886]
Observations	1582	216	337	312	544	150
Sargan	785.1	199.6	399.8	289.1	475.8	153.5
sarganp	1.12e-32	0.594	0.0000732	0.648	0.0000530	0.174
hansen	82.67	2.438	15.32	8.091	20.74	3.28e-24
hansenp	1	1	1	1	1	1
ar2p	0.00167	0.0783	0.0185	0.242	0.287	0.772

Standard errors in brackets, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 5. Conclusion

Although global imbalances have experienced a significant correction during the most recent crisis (in particular in Europe) they remain in place in East Asia, the Middle East, the CIS and the Latin American countries. Global imbalances remain subject to economic conflict and concerns about macroeconomic stability, as global net foreign asset positions – both with positive and negative sign – continue to diverge. Therefore understanding the driving forces of global imbalances is important to identify the most effective policy tools of adjustment (for the case adjustment is politically desired).

We have presented evidence that macroeconomic policy making (rather than exchange rate adjustment) is at the core of global imbalances. While expansionary monetary policy in the US in form of zero interest rate policies and quantitative easing tends to discourage US domestic private and public saving and therefore a current account deficit, many emerging market economies seem to pursue relative tighter monetary policies (linked to reserve accumulation and sterilization operations). These relative tight monetary policy stances seem to have contributed to improved current account positions. However, to which extent current account balances have tended to be more positive, seems to strongly depend on the fiscal policy stance. For many country-groups expansionary monetary policy paired with relative expansionary (tight) fiscal policy seems to be an important catalyst for negative (positive) current account positions.

As the empirical estimations results partially depend on the estimation framework more research is needed to compile results, which provide a robust basis for an adequate policy response. This is in particular the case to solve endogeneity problems. It seems, however, that as experienced in many European periphery countries and in East Asia following the Asian crisis fiscal austerity measures seem to be at the core of a consolidation of global imbalances. Furthermore, tighter monetary policy stances in the large industrialized countries would relieve many emerging market economies from the necessity of comprehensive sterilization operations, which seem to constitute another very important determinant of global imbalances.

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